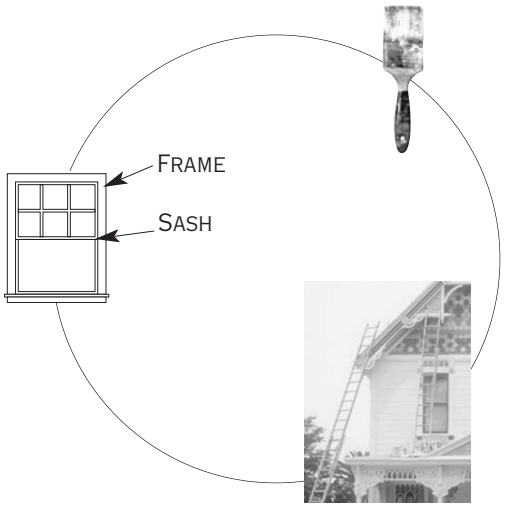
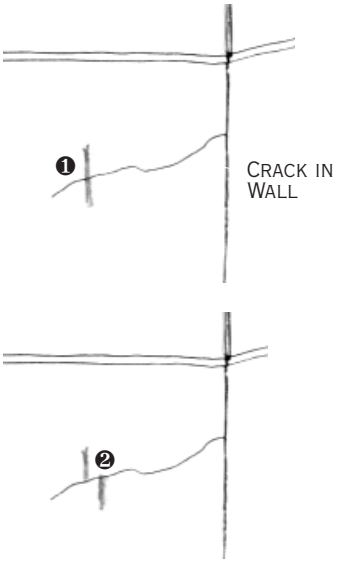


Rehab Tips and Techniques

Rehabilitation (or "rehab") can generally be described as making the necessary changes to allow a building to be usable again, incorporating (or recycling) as much of the original and existing building materials as possible. This differs from ***restoration*** where a building is brought back to its original state, and ***remodeling*** where an existing building is severely altered without concern for historic materials.

The information presented in this section describes how to recognize when major repair or rehab work is needed and when to call in a professional for assistance. Also described and illustrated are many simple techniques the property owner can use to make repairs. The text is divided into three sections: ***Exterior, Interior*** and ***Structural and Mechanical.***



Home Test for Crack Movement

- *Draw a line across the crack (especially those wider than a hair).* ❶
- *Observe the crack after two or three weeks. If the lines on the sides of the crack have moved apart, indicating movement of the house, call for professional help.* ❷

Exterior Treatments—What Your Neighbors See

FOUNDATION

"A sound foundation is the basis for all rehabilitation work because a weakened foundation threatens the very structure of the house."[1] Prior to commencing work on any exterior rehabilitation, a cursory investigation of the brick, rock, or concrete foundation of the structure should occur. The investigations should occur both at the exterior of the building and on the inside—at the crawlspace or basement. Look for these trouble indicators:

1. Cracks result because of settling soil, water undermining, or earthquakes. Both masonry and concrete can have minor hairline cracks which are not serious, but any cracking wider than a hair should have further investigation to determine if the cracking is continuing. One simple way to watch for movement is to draw a line across the crack with a straightedge and then observe it for two to three weeks. ☜1 If movement occurs, the lines across the crack will split, and it is time to call in a professional (contractor, engineer, or architect). If cracking is seen and self testing is not desirable, then call a professional for further investigation. As many historic structures are not constructed to current earthquake safety standards, seismic anchors and/or other techniques should be considered for structural safety. (See Brick Masonry, page 23.) If the crack is determined to be non-hazardous to the structure, patching the crack can improve the look of the foundation. Masonry patching and re-pointing is covered in the masonry section of this report, but concrete can be patched with an easily available concrete patch mixture.

2. Wetness caused by water seeping through the wall indicates improper site drainage and/or improper waterproofing of walls (most important in basements). Many historic buildings have deteriorated roof drainage systems such as broken downspouts which can cause rainwater to be dumped directly on the foundation of the building. Improper site drainage can cause surface water to run

[1] Rehab Right, *City of Oakland Planning Department*
☜1 *See illustrations for more information.*

towards the building. These water related problems can cause improper settlement of the footings by undermining, and constant water can cause deterioration of both brick and mortar. In basements, the water damage could be occurring from the lack of waterproofing at the exterior of the wall. Simple repair of broken downspouts, and proper grading of a site can alleviate many of these problems and can generally be done by an owner. However, a leaking retaining wall (water seeping through a basement wall) should be investigated by a professional to determine the proper course of action.

3. Crumbling bricks

and/or soft powdery mortar can be the result of the water problem described above. Bad mortar can be tested for by taking a car key or screwdriver and scraping the mortar joint. If the joint is easily scarred, the mortar may need repair, and a professional should be called upon. Crumbly brick, where the hard fired surface has been deteriorated should also be inspected by a professional (contractor, engineer, or architect).

Walls

Wood Damage

Wood is very susceptible to damage from moisture, rot fungus and insects. Identification of the type of damage and quick repair/replacement can keep the damage from spreading and avoid further repairs due to misunderstanding of the problem.

Wet rot is a fungus that attacks wood members which have been saturated. It can spread quickly to other wet wooden members nearby. Characteristics of wet rot include wood that:

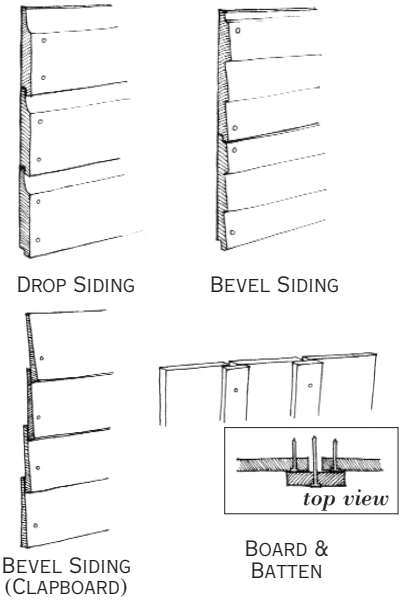
- looks charred, with splits along the grain, or dark vein-like strands
- feels spongy
- shows splits and flaking paint.

Dry rot is also a fungus. It is the fungus we typically think of at work in the forest breaking down dead wood. The characteristics of dry rot include wood that:

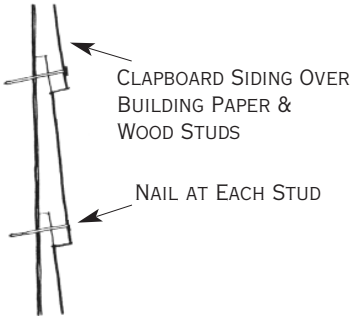
- shows thin white strands
- shows wool-like sheets with spreading tendrils
- feels spongy
- has a multitude of tiny open cells.

Testing for Extent of Wood Rot Damage

- *Prod the wood with a sharp tool, (preferably in an inconspicuous location) and observe resistance to marring. If the wood is sound, the prodding will loosen one or two relatively long slivers and the breaks will be splintery.*
- *Pry out a sliver of wood with a screwdriver. If toughness of the wood has been greatly reduced by decay, the wood breaks squarely across the grain and lifts out easily. If it is still tough, then it splinters and resists removal.*



Siding Styles



Wood Siding

Insects, especially termites, can cause damage to a wooden structure as well. If insect damage is suspected, contact a professional pest control firm for consultation, assessment and treatment.

Once the extent and type of damage has been assessed, follow the directions for repair of the damaged portion of the building in one of the following sections.

Wood Siding

Cracked, splitting, or missing wood siding can cause severe water problems by allowing water to deteriorate the wood stud wall or the interior finish. Water damage observed on interior walls may be a result of leakage from deteriorated siding. While small cracks can be filled with caulking, larger cracks or missing pieces should be replaced. ☜ To replace a piece of wood siding, gently pry up the piece immediately above the piece to be replaced, and cut the nails holding the piece with a hacksaw blade (removed from the hacksaw and held with a heavy pair of gloves). Using a chisel, remove the portion of unwanted wood, and replace with new *matching wood* siding. Renail the new area and caulk at the vertical joint. Depending on the type of wood and the style of the siding, replacement pieces may need to be custom milled.

Wood Shingles

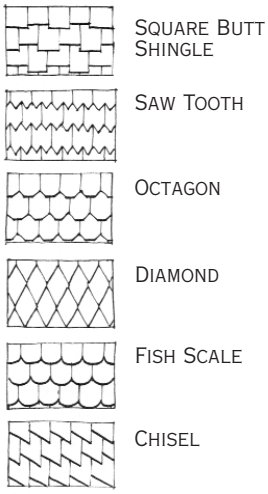
Minor repair to shingle walls is easily accomplished by simply nailing warped or splitting shingles with galvanized nails (to avoid rusting that may occur with common nails). More severe damage should result in entire replacement of the shingles. If ten or fifteen percent of an entire area needs replacement, it is probably best to replace the whole area.

Most historic structures have redwood shingles, and a similar type should be used for replacement. ☞ Scalloped shingles or other specialty shapes are available by ordering through most large lumber yards. In all cases a sample of the existing shingle

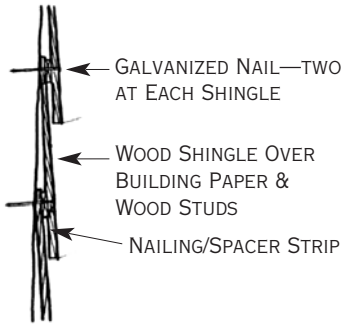
should be shown to the supplier to *insure a proper match of shape and material.*

Splitting, cracking, or missing shingles can be replaced ☞ by forcing a wedge under the shingle directly above the one to be replaced—only about one-eighth of an inch, then using a hack-saw blade to cut away the old nails. The shingle to be removed should then be split vertically, using a chisel, and removed. Insert the new shingle, align the bottom with the adjacent shingles, and nail at the top.

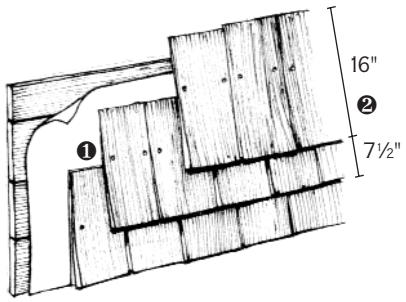
The painted shingles found in Victorian and California Ranch style structures should be painted to match adjacent shingles. Most shingles, however, are not painted or stained, but colored by natural weathering. This can cause a problem when attempting to patch an area, but can be solved by applying a light stain. Examples of the new shingle as well as the old should be presented to a paint dealer to assist in proper selection. If replacement is anticipated over a period of time, leaving the unused shingles outside will help the aging process commence prior to installation.



Shingle Patterns



Wood Shingles



Wood Shingle Installation

- *Place nails above top of previous course.* ❶
- *Two nails per shingle, ¾" from edge.*
- *No more than 7½" of a 16" shingle should be exposed.* ❷

Sections of a House to Paint

- *Limit the number of different colors on a house to three at most.*
- *The base of the house ❶ visually supports the rest of the house. The base should complement the color of the body of the house, for example, as a darker shade of the color used for the body.*
- *The body of the house ❷ is generally considered the basic color of the house.*
- *The trim areas of the house ❸ receive the second color in a two-color paint scheme.*

Painting

"Paint is the single rehabilitation decision which can unify or destroy neighborhood quality." The color of the exterior of a building should be very carefully selected to be harmonious with the style of the building and with neighboring buildings. The Color section on page 63 addresses proper color selection, while this section will address how to paint for lasting results.

The key to painting a wood exterior is preparation. The best paint job in the world will deteriorate rapidly if the surfaces are not properly prepared prior to the first coat of paint.

First, inspect the entire exterior and determine the general state of the existing paint. All crumbly, flaking, blistering, and peeling paint must be removed. By surveying the entire job to understand the amount of work necessary to do it right, a decision can be made as to whether or not to call in a painting contractor to complete the job.

Paint Colors—Rules of Thumb

- *Use light colors to make a small house look larger.*
- *Darker colors can be used to make a large house or section of a house look less massive.*
- *If trim features are unattractive, paint them the same color as the part of the house they adjoin to minimize their impact.*

The following steps should be taken prior to starting surface preparation:

- All wood siding, shingles and trim should be repaired as described above.
- All door, window and general trim should be inspected for water tightness and caulked if necessary.
- Windows should be inspected for damage, such as bad putty, and repaired.
- All gutters and downspouts should be inspected and repaired as necessary.

Surface preparation should include the use of a wire brush to remove dirt, previous plant growth, and flaking paint. A scraper should be used to remove areas of blistering paint, followed by sandpapering to smooth down the transition between the scraped area and the adjacent painted area. When large damaged areas occur, heat gun-type paint removers may be the best solution, but should be used strictly according to supplier's recommendations.

After the working area has been properly scraped and sanded, all exposed wood must be primed, and then the whole area can be painted. A paint dealer will assist in determining the type of primer, paint, brushes and quantities that will be needed.

Brick Masonry

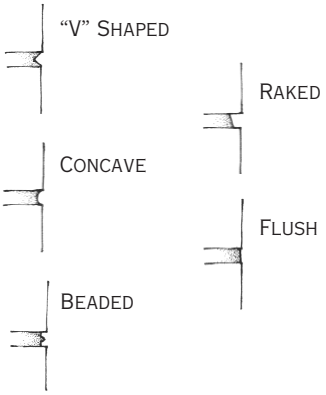
Brick masonry generally requires attention because of cracking, deteriorating mortar joints or painting.

Wall cracking and deteriorating mortar joints (see determination in Foundations section) should be addressed by a professional (contractor, engineer, or architect). These problems could be structural in nature and, because most historic buildings have un-reinforced masonry, may necessitate structural strengthening (for safety in times of an earthquake). If structural strengthening of a masonry wall is determined to be necessary, the design and construction of this work should be undertaken only by those experienced in addressing *historic* buildings, so as not to damage the historic fabric of the building.

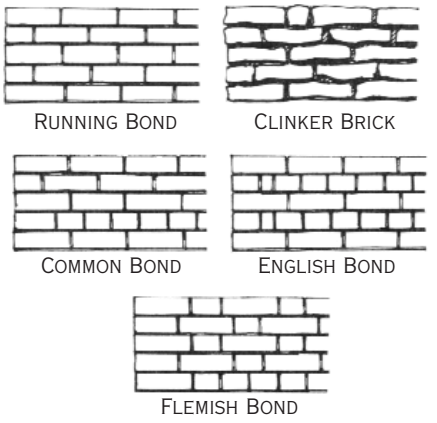
Repointing the mortar (repairing the mortar joints) in a historic building is a very specialized operation, and should be performed only by experienced masons. All old crumbly material must be removed to a uniform depth (avoid the use of mechanical grinders which can damage the brick surrounding the joint), and replaced with the exact style of adjacent joints, using a mortar composed of materials which represent the original color and strength. All work should comply with the recommendations in *Preservation Briefs #2*, "Repointing Mortar Joints in Historic Brick Buildings" by Robert C. Mack, A.I.A. which is available at the City of Riverside Planning Department or from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

The first rule in addressing the finish of a brick masonry wall is DO NOT SANDBLAST. Sandblasting will damage the natural fired surface of the brick, and cause it to lose its water repellent qualities. If water is allowed to invade the inner brick, its structural integrity may be ruined.

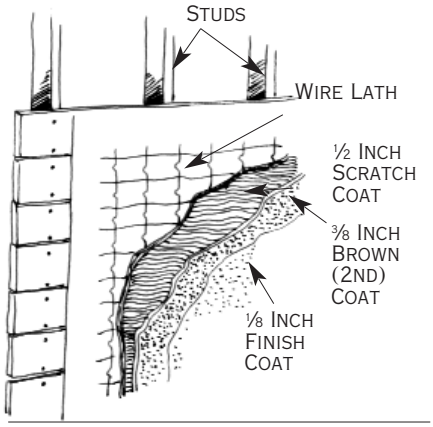
Most brick masonry in historic buildings was left natural, but if it can be determined by investigation that the original struc-



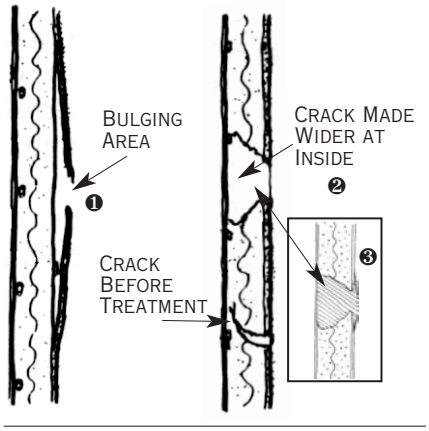
Typical Mortar Joints



Brick Patterns



Stucco Construction



Repairing Stucco Cracks

- *A bulging area indicates that the last coat of stucco has become separated from the previous coat.* ❶
- *Tap the bulging areas and remove all of the separated stucco.*
- *Open the crack and remove loose debris.*
- *Using a cold chisel and hammer, make the crack wider at the inside than at the outside to keep the new and old material locked.* ❷
- *Clean and wet the area.*
- *Follow all manufacturer's instructions. Be sure to pack the plaster in tightly.* ❸

ture was painted, or that in the course of the building's use it has been painted due to an alteration where painting was aesthetically desirable, then the walls may be properly prepared and repainted.

However, most brick masonry walls were and should be left natural. Paint removal is generally recommended to return a building to its original splendor, but the operation should be performed carefully. Generally, the sequence which should be employed to remove paint is with the least severe method first, and only after unsatisfactory results, proceeding with the next least severe level of paint removal. These steps include pressure water spray with mild detergent and bristle brushes, chemical cleaning with a mild solution, then chemical cleaning with a more vigorous solution. All work should be thoroughly tested at inconspicuous places on a building, and preparations should be made for the final disposing of cleaning chemicals. Due to the possible need for chemical use and disposal, an architect or professional contractor should be employed. The contractor should work carefully to meet all City standards regarding uses of chemicals in cleaning buildings. All masonry cleaning should follow the guidelines as presented in *Preservation Briefs #1*, "The Cleaning and Waterproof Coating of Masonry Buildings" by Robert C. Mack, A.I.A. which is available at the City of Riverside Planning Department or from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Stucco

Stucco has a natural tendency to crack, but is generally easy to repair. Make sure the patch will match the rest of the wall in color and surface texture when completed. Prior to commencing the patching process, a thorough inspection of the cracks should be made to determine if additional water damage occurred in other portions of the wall. Slightly bulging areas adjacent to the crack indicate the last coat of stucco has become separated from the previous coat.

Lightly tap the bulging areas with a hammer to remove all of the separated stucco and extend the repair area to include these areas.

☞ Use a putty knife to open a crack and to remove loose debris. Then use a cold chisel and hammer to make the crack

wider at the inside than at the outside to create a positive joining of the new and the old material that is locked. Thoroughly clean and then wet the area to receive the patch so that the old area does not rob the new material of its moisture. Plaster patch is readily available at most hardware stores and is easily mixed with water. Follow all manufacturer's instructions. Apply the patching material using a trowel and be sure to pack it in the space tightly. After about 10 to 20 minutes of drying time, level the patch with its adjacent surfaces with a trowel. Consult the manufacturer's suggestions regarding any necessary curing.

Large areas of patching or sections which have to be replaced to the stud wall should be handled by an experienced plaster contractor.

Color pigment should be added when patching integral colored stucco. These pigments should be used with the patching compound as per the manufacturer's instructions. Careful testing and recording of the amount of pigment added should occur prior to placement to insure proper color matching.

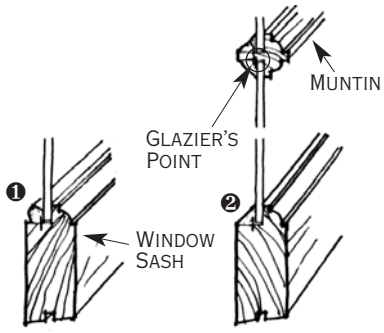
If the stucco has been painted, a sealer on the new patch prior to painting is probably necessary.

Windows

Most historic structures prior to 1960 utilized wood windows that were either fixed, double hung or casement. Problems can occur with all three types, ranging from simple need of painting to completely rotted wood members. The size, shape and style of windows are an important feature of the architectural style of a building, and the original type should be utilized if at all possible. Although aluminum windows are less expensive than wood windows, they should *not* be used in historic buildings where wooden windows originally existed.

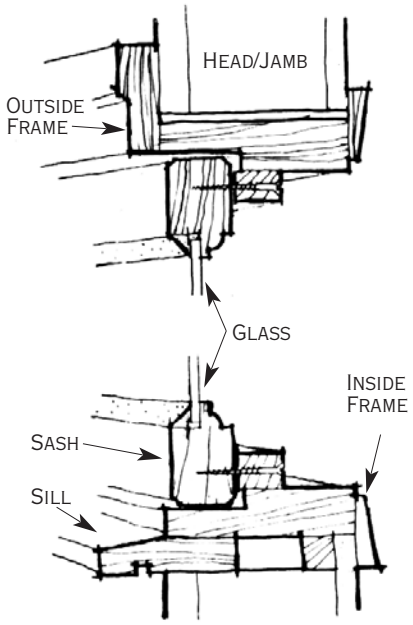
Many wood windows can be repaired by simple methods or replacement of wood pieces or glazing.

A broken pane of glass is replaced ☞ by first removing the existing putty from the window. Sometimes a soldering iron or torch is necessary to heat up the old putty to make it easier to remove. After removal of the old putty, remove the glazing points. Then the wood should be sanded smooth, and painted

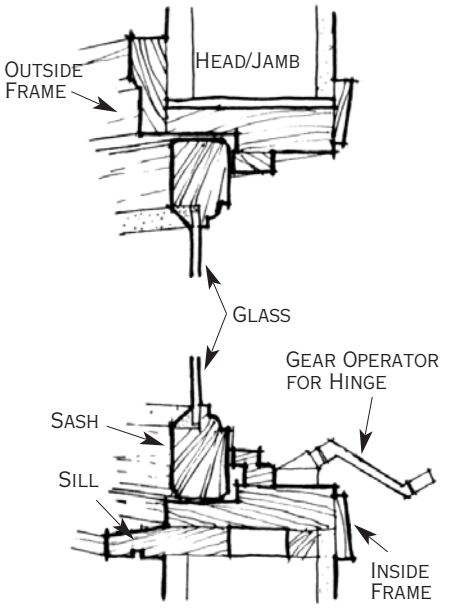


Replacing Broken Glass in Windows

- *Remove existing putty from window.*
- *Remove glazing points.*
- *Sand wood smooth and paint with primer.*
- *Cut new pane of glass ⅛ of an inch smaller than opening.*
- *Apply glazing compound, place glass in firmly, secure with glazier's points.*
- *Push first quality compound, rolled into a long line about ⅜ inch diameter along glass.* ❶
- *Use a putty knife to tool a smooth, angled bead.* ❷



Fixed Windows are Installed as a Whole Unit



Design of Casement Windows

with a primer to seal it. The new pane of glass should be cut about one-eighth of an inch smaller than the opening (all sides of the pane should be measured to catch differences because the opening usually is not square). Apply new glazing compound, place the glass in firmly, and secure with glazier's points located about six inches apart. Use first quality compound, rolled into a long line about ⅜ inch in diameter, and push it along the glass. Use a putty knife to form a smooth, angled bead. Follow manufacturer's recommendations for drying time of compound prior to painting.

Wood members with small and minor holes can be repaired by cleaning out the area to be repaired of all loose debris and filling with a good quality putty. After drying according to manufacturer's recommendations, sand, prime and paint.

Weatherstripping can and should be added to historic windows to improve the energy efficiency of the house, see page 51.

Fixed Windows

The components of a fixed window as shown on the adjacent sketch are easily repaired by replacing the necessary pieces or by replacing the whole window. Pre-made fixed window frames are available at most lumber yards, but should be carefully selected to replicate the existing style. Many times, simple surface preparation and painting is all that is necessary.

Casement Windows

Wood casement windows are relatively simple in their operation, and when troubles occur, they are usually in the cranking mechanism, which can be repaired or replaced. Locks and hinges also may be the source of problems, and tightening, aligning or simple lubrication often corrects the problems. New wood casement windows are available from a number of manufacturers if replacement is necessary. Special care should be given to match the original style if possible.

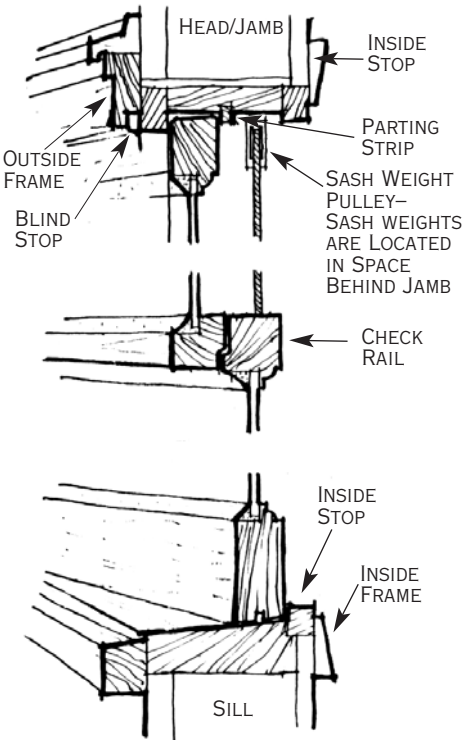
Double Hung Windows

These windows are very common in historic buildings and are somewhat complex in their operation as can be seen in the sketch. ☞ Repair of the window is more desirable than replacement, so careful investigation of any problem is suggested. Sticking is a very common problem, and is often caused by insufficient drying time of paint, too many layers of paint, or accumulations of dirt and debris. Many times sticking can be eliminated by gently tapping a hammer against the frame of the window to jar loose dried paint or debris, and then opening the window. Sanding or cleaning the jambs, then lubricating with paraffin will often make the window operational again. If severe warping has occurred, the window sashes will have to be removed and planed. This process, as well as any major work with the cords or weights could be completed by an experienced finish carpenter or try it yourself referencing Preservation Brief #9, Repair of Historic Wooden Windows, available in the City Planning Dept.

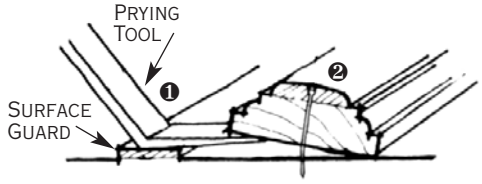
Ornamentation and Trim

Ornamentation and trim are often in need of repair or replacement. Great care should be taken in handling these materials, for many times they are the parts of the house that can make the structure so special. Wood ornamentation and trim should never be roughly hammered or pried loose. NEVER SANDBLAST ornamentation or trim to remove accumulated paint. Oftentimes, simple re-attachment of trim or ornamentation can solve the problem. Always use galvanized finish nails (or wood screws if necessary to re-attach), set and fill with putty.

If the trim needs to be removed to be repaired or copied, ☞ inspect the attachment carefully prior to any work. Determine how the piece is attached and carefully plan your actions being sensitive to the material and its weaknesses. Any prying action should be slow and careful, with a minimum amount of force. The prying bar or hammer should rest against a thin piece of wood to alleviate damage to the adjoining surfaces.



Design of Double Hung Windows



Removing Trim

- *Inspect trim before removing, determining how the piece is attached and carefully plan your actions.*
- *Pry trim slowly and carefully, resting the prying bar against a thin piece of wood to protect adjoining surfaces.* ❶
- *If trim or ornamentation is comprised of several layers of materials, sketch the components as they come apart to insure proper reassembly.* ❷
- *Use galvanized finish nails or wood screws to reattach the trim after repair.*

If the trim or ornamentation is comprised of several layers of materials, it is wise to sketch the components as they come apart to insure proper re-assembly. Broken pieces can usually be repaired with a good wood glue, by following manufacturer's instructions and gently securing the pieces together with a clamp or band. Care should be taken to wipe off excess glue. If the pieces are beyond repair, an expert finish carpenter should be retained to duplicate the original work. The original design and the type of wood should be copied. Replacement of removed trim and ornamentation should occur just as carefully as the removal, and pieces should be caulked where water infiltration might occur.

Many carved and detailed pieces of ornamentation can lose their detail by the continuous application of paint. Careful removal of the paint by heat gun or chemicals will revive the original detail. Never use abrasives on delicate ornamentation. An experienced painting contractor sensitive to historical buildings is the most likely to preserve ornamentation detail properly.

Front Doors

The front door to a home can enhance or detract from the value and overall look of the rehabilitation project. Original doors or replicas should be used where possible. If no front door exists, or it is clearly not original, research doors on other homes of the same period. An ornate, raised panel door with a leaded glass inset might appropriately grace a Victorian house but would look out of place and reduce the value of an otherwise beautiful Ranch style home.

Fencing

Front yard fencing (fencing visible from the street) can enhance the architectural character of an historic house and neighborhood. Inappropriate fencing can detract from an otherwise fine rehabilitation project and bring down property values. Although fencing contractors can be helpful with cost and installation recommendations, it is best to research fencing styles along with the research of the architectural style of your home. Chain link and solid wooden fences are not appropriate in the front yard.

The following is a preliminary list of fencing by historic period. Front yard fencing in many historic periods was not common and should be avoided, if possible,

with homes from such eras. Use of materials found on the exterior of the home is a positive approach to providing a fence where one did not exist historically, as well as the basic characteristics and ornamentation listed for the style in the "Local Architectural Styles" section of this book.

Victorian If the front yards were fenced, wrought iron pickets (about 3 feet tall) with simple pounded arrowhead shaped finials were used.

Turn of the Century This classical style did not typically have fenced front yards in California. On the East Coast, some "colonial" homes had white, wooden picket fences. Such fencing would not enhance the West Coast stucco versions of this style.

Craftsman and Bungalow Front yard fencing was not common during the time that these architectural styles were in fashion. If it is a must, stick to the installation and use of materials that are consistent with the exterior of the home.

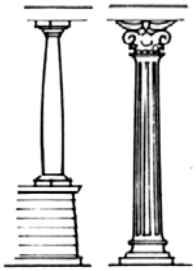
Period Revivals Mediterranean and French Provincial Revivals with their plaster exteriors were sometimes fenced with front yard walls of the same finish as the exterior of the house. Some Mediterranean homes even had high "courtyard" walls in the front that hid the house, as was common in Europe. Gates were often heavy wood or wrought iron that matched the materials used on the house.

Post WWII Vernacular Front yard fencing was not common during this historic period. Sometimes side yard fencing extended to the sidewalk but did not enclose the entire yard.

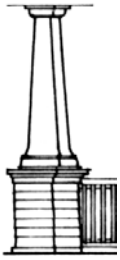
California Ranch Front yards were occasionally fenced for decorative purposes during the time that the Ranch house was popular. Wooden split rails and other low horizontal wooden fence forms were most common, in keeping with corral or ranch fencing methods. Sometimes old wagon wheels were integrated into the fencing.

Modern Homes of the Modern tradition should not be fenced if at all possible. If fencing must be placed in front of the house, care should be taken to respect the materials used in the house and be kept low and horizontal in design.

COLUMNS ON PRE-1900 VICTORIANS WERE USUALLY TURNED OR SQUARE CHAMFERED WOOD AND HAD SIMILAR PROPORTIONS TO ACCOMPANYING FRETWORK.



THE MANY COLUMN VARIATIONS ON TURN OF THE CENTURY HOUSES INCLUDED A SIMPLE SHAFT WITH A SQUARE TUSCAN-LIKE BASE AND A WOOD AND PLASTER REPLICA OF IONIC OR CORINTHIAN STYLES.



CRAFTSMAN AND BUNGALOW STYLES USUALLY INCORPORATED TWO LARGE COLUMNS AT THE FRONT OF THE HOUSE.

Column Examples

Porches, Stairs, Columns and Balustrades

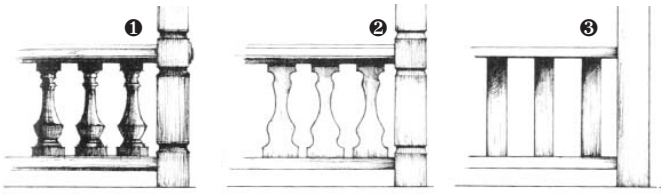
These elements are an important feature of historic buildings and should be retained.

Rotting and worn out porches and exterior stairs need to be replaced with care so that the value and original character of the home is maintained. Before replacing an existing stair or porch, determine if it was original to the home in style and/or location. If so, use like materials and styles.

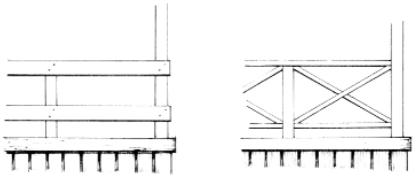
The columns on Victorians were usually turned or square chamfered wood and had similar proportions as the accompanying turned or ornamental fretwork balustrades. Turn of the Century houses had many variations, two of which include a simple shaft with a squared Tuscan-like base and capital, and a wood and plaster replica of the Ionic or Corinthian style. The Craftsman and Bungalow styles usually incorporated two large columns at the front, which has a base of brick, wood siding, plaster, stone or shingles, and a tapering shaft of wood or plaster. The examples shown on these pages are illustrative only.

Care should be taken in repairing or replacing these columns to keep the visual impact of the original design. Discretion should be maintained in selecting finishes for porches. Usually a little paint removal, wood putty or stucco patch, and new paint will solve most problems. Special care should also be taken in selecting colors. Bright colors such as orange, bright red, or lavender should *not* be used. Refer to Color, page 63.

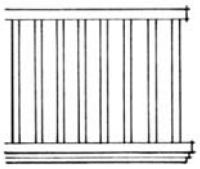
The balustrades of the Victorian porches were mostly turned wood or ornamental fretwork, and were an important decorative feature of the style. The Turn of the Century houses generally had solid banisters on the porches, covered



The balustrades of Victorian houses were mostly turned wood or ornamental fretwork. When reconstructing these balustrades, by far the most preferable is to use the turned wood like the original. ❶ *A less preferable alternative is to use stock lumber and moldings to approximate the original railing.* ❷ *Avoid using plain lumber, as this destroys the original look.* ❸



Ranch style homes



Craftsman and bungalow styles usually had a solid banister or a simple vertical balustrade

Balustrades—Types and Preferable Reconstruction Techniques

with the major material of the house, such as wood siding. The Craftsman and Bungalow styles sometimes had a similar solid banister, or a very simple vertical balustrade as shown. Wrought iron is used only with mediterranean revival styles. Flat horizontal rails characterize the ranch style porch. If railings are necessary on an international style home, steel columns and railings should be used to match the style.

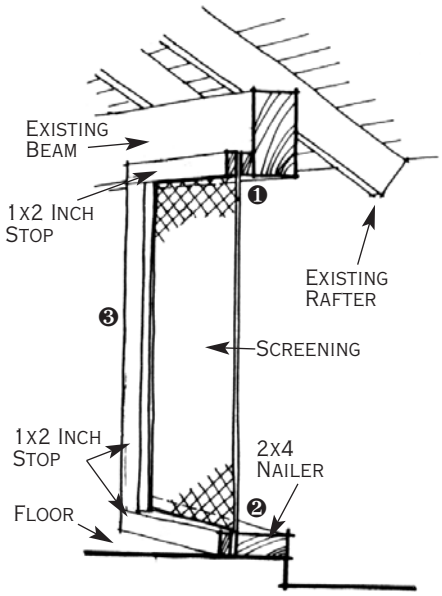
These balustrades are important and should be repaired or replaced to match the style of the house. It is important not to incorporate wrought iron or a "Western" type horizontal wood railing on a Victorian porch, just as an ornate turned-wood Victorian balustrade is not appropriate on a craftsman bungalow. In historic restoration, it is best to remove screened or glassed-in walls to restore the integrity of the original design.

Screened Porches

Screening porches on old houses is a common desire of many owners. ***This is not recommended*** for houses which did not originally include screening because it will alter the original massing of solids and voids of the building, and generally disrupt the overall appearance. If screening must be built, it should be installed so that it can easily be removed, with little or no damage to the original building.

Generally, a wood stop should be applied at the house side of the column, post, or overhead beam, so that the screen can be attached to it. ☞ Care should be taken in attaching the stop to *not* severely damage the existing material of the house (it is recommended that an experienced architect or contractor be consulted). A 2x4 inch redwood nailer can be attached to the floor of the existing porch if necessary for attachment. It should be carefully aligned to receive the screen. The screen should then be applied to the nailers, and a 1x2 inch wood stop should be applied over to cover the edge of the screen.

There are many different conditions and materials in the different styles of houses found in Riverside, and this example is only a general guide. Again, it is recommended that a professional be consulted to limit the amount of damage to the existing porch design.



Screening a Porch (screening porches is discouraged unless the original porch was screened)

- *If a porch must be screened, attach a wood stop at the house side of the column, post, or overhead beam.* ❶ *Take care to NOT severely damage the existing material of the house.*
- *Attach a 2x4 inch nailer to the floor of the porch if necessary, aligning it carefully to receive the screen.* ❷
- *Apply screen to nailers.*
- *Attach a 1x2 inch wood stop to cover the edge of the screen.* ❸
- *It is recommended that a professional be consulted to limit the amount of damage to the existing porch.*

Roofs

Roofs are important to historical buildings both functionally as weather protectors, and in many styles visually, being a definite component of texture, massing and color of the building. The Architectural Styles and Design Guidelines sections address these design features, while this section addresses the mechanics of repair and/or replacement of roofs. Great care should be taken to make sure that roofs are water-tight and aesthetically complimentary to the building.

Most of Riverside's historic buildings originally had shingle, shake, tile, crushed rock, crushed brick or flat composition roofs. Currently, many of the structures have had their roofs changed to the cheaper, longer wearing and non-combustible asphalt shingle. Appropriately chosen asphalt shingles can be satisfactorily used on historic buildings, but the first choice, if at all possible, is to use original materials.

Roof leaks should be quickly identified and repaired to eliminate the destructive abilities of water at inside surfaces, as well as to structural members. Leaks occur at two general areas: l) where the roof intersects another type of material, such as a wall or a chimney and the flashing needs repair; or 2) the roofing material itself is leaking. The exact location of a roof leak can be very frustrating to try to locate, because the water may travel prior to becoming noticeable. The wet spot in the ceiling is rarely directly below the actual leak in the roof. The inspection for the leak should take place in the attic of the building, starting at the location of the wet ceiling, then looking up to see where the water is coming from in the roof rafters or sheathing. Many times water leaking in from the ridge area will travel down framing members before dropping on the ceiling where the leak is noticed. Carefully mark the location of the leak once it is located, and during the course of the rain, caulking can be forced into the hole to act as a temporary barrier, however, this will not suffice in the long run and alternate remedies must be taken. If the leak occurs where the roof intersects a wall or chimney, the water will usually travel down the wall or chimney, and a flashing problem is obvious.

Flashing

Flashing ☞ should be inspected every eighteen months to identify potential problems. Generally, most observed gaps can simply be filled with a roofing compound available at most hardware stores.

A more serious problem can occur when the flashing pulls away from the vertical surface, usually seen in masonry. The old mortar must be carefully removed (see Masonry section), flashing replaced into the joint, and proper mortar re-applied.

Wood Shingles, Wood Shakes, and Asphalt Roofs

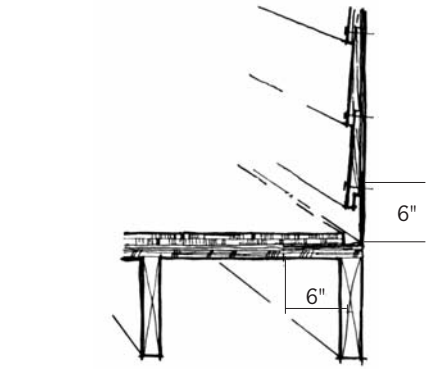
can be repaired as described in the Walls section, however, prior to placing the new shingle or shake, the area below should be coated with a roofing compound to insure water protection. New wood shingle or shake roofs can be applied over only ONE old roof. If two layers already exist on the roof, all the roofing must be removed prior to placement of the new roof. Asphalt roofing may be applied over TWO layers of existing asphalt roofing. If three layers already exist, all three layers must be removed prior to placement of the new roof.

Fire retardant shakes and shingles are now available, which greatly reduce the possibility of fire spreading to these wood roofs. They are more expensive, but the protection is well worth the additional cost. A roofing supplier or contractor will be able to explain the cost difference to you, and a conversation with the fire marshall could be of interest in assessing how valuable they might be.

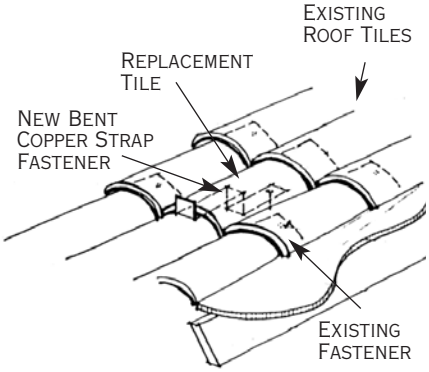
Spanish Tile Roofs

are generally brittle and break easily if walked upon incorrectly. Many companies still manufacture clay tile roofs, but difficulty may arise when trying to match the style and shape of a particular roof tile. Over the years, the casting styles have changed, and an attempt should be made to match the original tile. (Contact a major roof material supplier who should be able to tell you if a matching tile is available.) If no new tile matches the existing tiles, one of the three alternatives listed below should be followed:

1. Try to locate a building being removed and destroyed that has a similar roofing material, and work with the owner of that building to obtain salvaged tiles.



Flashing



Replacing Spanish Tile

- *Every attempt should be made to match existing tile.*
- *When working on Spanish tile, work from scaffolding or walk in valleys of tiles to minimize damage to brittle tiles.*
- *Remove damaged tiles.*
- *Patch roofing material underneath.*
- *Install new tile, using a copper strap as support.*

2. If the building needing repair has blind spots—areas where the roof cannot be seen—remove tiles from those areas to use in the visible repair area, and reroof the less visible area with a new pattern tile.
3. Use the available tile that most closely matches the existing tile.

Replacing a Spanish tile is not an easy task and should be approached carefully. When walking on a Spanish tile roof, either work on scaffolding, or be careful to walk in the valleys of the tile, where there is more support. The damaged tile should be removed, and the area under it treated with a roofing patch material. The new tile should be placed over a copper strap, which acts as the support for the new tile.

Flat Composition Roofs

tend to blister, causing cracks which may leak. The leaks are easier to locate because there is little slope to cause the water to run. Blisters can be repaired by cutting around the blistered section, placing roofing compound on the surface under the roofing, and then replacing the roofing and nailing it securely around the edges. Pin-hole type leaks can usually be repaired by simply applying roofing compound over the area in which the leak is suspected to be located.

Landscaping

Historically, Riverside's rich array of residential styles were accompanied by a series of complementary landscaping designs. The city was nationally known for its civic planting efforts, landscaped boulevards such as Magnolia and Victoria Avenues, and the many private gardens designed by both professional landscape architects and homeowners. Early residents experimented creatively with a wide-variety of plant types from all around the world, and were especially taken with species from arid climates such as the Mediterranean and Australia. In fact, many of the plant types we know think of a drought-tolerant were introduced and used in the early part of this century. Of course, the many people from diverse cultures brought with them their own sense of landscaping, and the results were often an interesting amalgamation of a variety of styles and sensibilities.

Guiding Principles

The front yard is clearly the most important landscape area from the community's perspective and from an historic one. Careful consideration of the existing conditions of your home and landscape features are critical to the design and planning of any new landscape improvements within the front yard. We recommend that the property owner consider the following issues when planning front yard landscaping:

- The relationship of the front of the house to the street;
- The architectural style of the home;
- Location of any existing grading conditions—berms, terraces, or depressions;
- Location of lot boundaries;
- Identification of any significant existing structures, features, trees, fences, walls or special paved areas; and
- Any specific soil, sun exposures, or view conditions.

After you have an understanding of your site's existing conditions and features, you or your landscape architect will want to implement a plan that exhibits a thoughtful design approach. A few design principles to keep in mind are:

- Scale: This involves the organization of landscape elements that are in good proportion with one another, the house, the lot, and the neighborhood. Remember to anticipate the mature sizes of the plants you choose.

- Unity: A unified landscape expresses common, shared, and thematic qualities, and involves a thoughtful blending of similar landscape features.
- Balance: This principle recognizes the importance of both equal (symmetrical) or unequal (asymmetrical) visual weight within the landscape. Balance is achieved by an integration of both hardscape elements and well-chosen landscape materials.
- Hierarchy: This involves the organization of landscape forms, colors, patterns and material into primary, secondary, and sometimes tertiary orders so that certain elements stand out and others play important supporting roles in the overall landscape design.

Appropriate Plant Materials

The list on page 78 indicates trees, shrubs, ground covers, and vines that were available and commonly planted in the Riverside area between 1900 and 1945. Property owners are encouraged to consider them as suitable plants to use when landscaping yards of historic houses.

Interior Treatments—What You Live With

Floors

Hardwood Floors

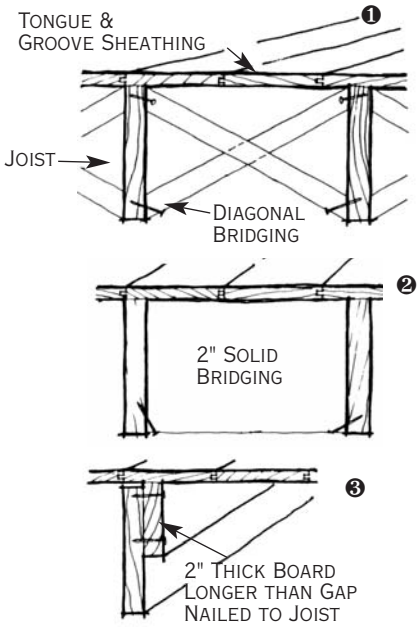
are found throughout Riverside's historic buildings, and generally may have three types of problems: squeakiness; severe damage to the wood; or staining, painting or water damage, necessitating refinishing. The material used is usually oak, but many maple, pine, and fir floors can be found in historic buildings.

Squeaking can be caused by movement at either the floor joists below the floor, or by improper attachment of wood flooring. ☞ If the joists are accessible, perhaps in a basement or crawlspace, reinforcement of the floor joist often solves the problem. After locating the squeak, look for any adjacent bridging of blocking nearby, and if loose renail securely. If this does not solve the problem, a next step would be to add solid bridging directly under the squeaking area. Another method of solving the problem is add a two inch board directly adjacent and parallel to the joist at the squeaking area to provide additional support for the flooring.

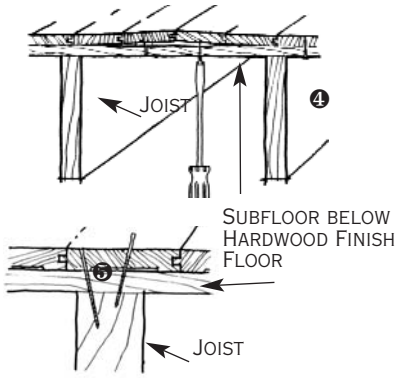
If the attachment of the flooring, rather than movement of the floor joists is a problem, the flooring may be reattached directly to the subflooring by using a wood screw up through the subfloor into the oak flooring to pull it back down to the subfloor.

If these methods do not work, or if the joists are not accessible, nailing from the top will usually solve the problem. The flooring should be pre-drilled using a drill bit about one-half the diameter of the nail to be used, then annular-ring nails should be used for nailing. This method can also be used to level cupped boards. Nails should be set, and holes filled with putty, and the adjacent surface sanded.

If problem is movement of floor joists:



If problem is attachment of flooring:



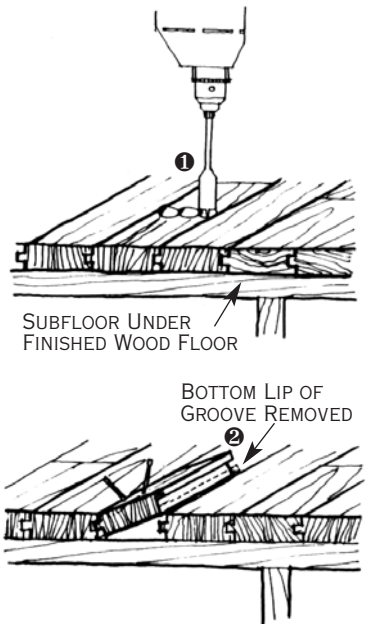
Repairing Squeaky Hardwood Floors

If caused by movement of floor joists below floor:

- *Reinforce (renail) diagonal bridging* ❶ ***or***
- *Add solid bridging directly under squeaking area* ❷ ***or***
- *Add two inch board directly adjacent and parallel to the joist at the squeaking area* ❸ ***or***

If caused by improper attachment of flooring to subfloor:

- *Reattach flooring directly to subflooring by using a wood screw up through the subfloor* ❹ ***or***
- *Pre-drill using a drill bit about one-half diameter of the nail to be used then use annular-ring nails in "V" formation* ❺ *to attach floor to subfloor.*



Replacing Wood Flooring Pieces

- *Drill a series of holes only deep enough to penetrate wood floor.* ❶
- *Use a chisel to split the piece, then pry the piece out.*
- *Square the section where the drill holes remain to provide a smooth, straight joint.*
- *Cut a new piece to provide a tight fit (start with a piece slightly too large, then sand it down to fit).*
- *When proper fit is achieved, remove the bottom half of the "groove" portion.* ❷
- *Coat the ends of the new piece with wood glue, then tap new board into place, using a block of wood as a buffer.*

Severely cracked or damaged pieces may have be replaced. Use a ⅝ inch drill bit to drill a series of adjacent holes, only deep enough to penetrate the wood flooring. Care should be used to avoid damage to the adjacent pieces of flooring. Use a chisel to split the piece to be removed, and then chisel and pry the piece out. Square the section where the drill holes remain to provide a smooth, straight joint. The new piece should be cut to provide a tight fit (start with a piece slightly too large, and sand it down to fit—it should fit tightly, but should not cause movement of the original pieces when inserted).When a proper fit is achieved, the bottom half of the "groove" portion should be removed, both ends of the new piece coated with wood glue, and the new board gently tapped into place, using a block of wood as a buffer. The new piece should then be nailed and filled as described above.

Hardwood Floor Finishes

	wearing ability	*stain resistance*	*application*	*finish*	*waxing*
conventional varnish	long wearing	stain resistant	long drying	gloss	needs waxing
fast dry varnish	medium wear	easily touched up	quick dry	gloss	no waxing
poly-urethane	long wearing	very resistant	easily misapplied	gloss, satin	no waxing
penetrating sealer	short wear	not resistant	easy to apply	not glossy	needs waxing
oil finish	short wear	not resistant	apply carefully	rich luster	

Refinishing a wood floor should be handled by a professional finishing contractor who has proven experience. The process includes removing the wood base, drum sanding, disk sanding, and hand sanding to remove existing finishes and to level the floor. Staining is not generally required, unless to match old and new wood. There are many types of finishes for hardwood floors, including conventional varnish, fast dry varnish, poly-urethane, penetrating sealers, and oil finishes. Conventional varnish is moderately long wearing and stain resistant. It has a long drying time, leaves a gloss finish, and generally requires waxing. Fast dry varnish is quicker to dry, is easily touched up, and requires no waxing. It has a gloss surface, and has a medium wear life. Poly-urethane provides the hardest surface, is long wearing and very resistant to staining and scarring. It requires no waxing, and has a gloss or satin finish. It cannot be patched, and is easily misapplied. A penetrating sealer is easy to apply and touch up, and does not leave a glossy finish. It is not long wearing, and does require waxing. An oil finish has a

beautiful rich luster, and is easy to touch up. It also is not long wearing, and tends to darken with age. The finish may be applied by an owner, rather than a contractor, but should be carefully applied, following manufacturer's recommendations. Generally, it should be rolled on (brushing at the corners and along the walls) using two thin coats.

Sheet Flooring

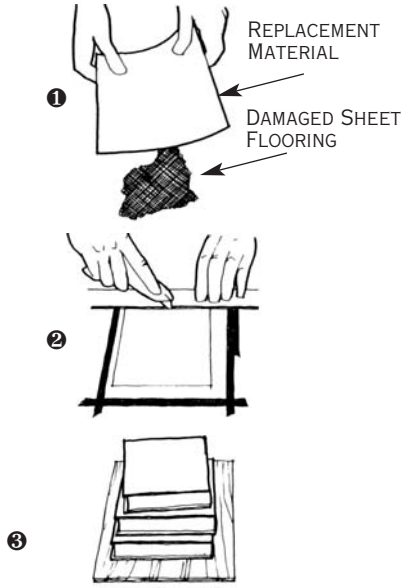
can be replaced if matching pieces of the material are available. A little investigation of the flooring material under the sheet flooring may result in finding a beautiful oak floor that has been covered over. Even if there seem to be insurmountable amounts of adhesive covering the wood floor, refinishing can often remove all the adhesive.

If replacing the damaged piece of sheet flooring is desired, ☞ place the piece of replacement material (cut larger than the area to be patched) over the damaged area, and tape down the new material tightly. Using a linoleum knife and a straightedge, simultaneously cut a square larger than the original hole, but smaller than the replacement piece, through both layers. Remove both the old and the new pieces, and place the new piece in to verify the fit. Apply adhesive to the underside of the new piece, and set in place, wiping clean any excess adhesive. Place a piece of plywood over the area, and add some weight on it—such as a number of books—until the adhesive has dried.

If a whole room is to be relaid with sheet flooring, it is advisable to hire a flooring contractor. One item to consider is that most historic buildings never used a "coved" return at the walls, and if wood baseboards exist in the room, they should be carefully removed and replaced after the flooring has been laid. ☞

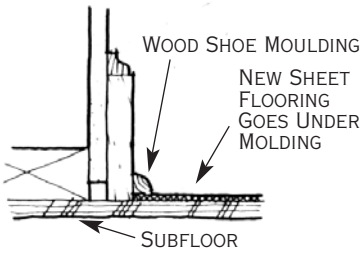
Ceramic Tile

was a common flooring material in historic buildings. The material is an important element of the historical fabric, and should be cleaned and repaired if possible. The ceramic tiles were often set in a mortar bed, and then grouted. The most important part of repairing or replacing parts of a ceramic tile floor is to select a matching tile, and a matching mortar color. Most



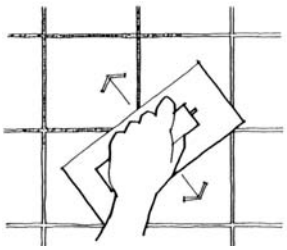
Replacing Portions of Sheet Flooring

- *Place the piece of replacement material over the damaged area.* ❶
- *Tape down new material tightly.*
- *Use linoleum knife and straightedge to simultaneously cut a square larger than the original hole, but smaller than the replacement piece, through both layers.* ❷
- *Remove old and new pieces, then place new piece to verify the fit.*
- *Apply adhesive to the underside of the new piece and set in place, wiping clean any excess adhesive.*
- *Place a piece of plywood and some sort of weight on top of the new piece until the adhesive has dried.* ❸



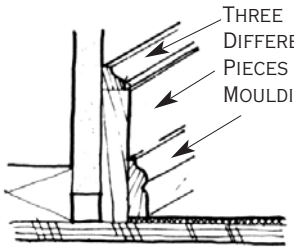
Remove then Replace Wood Shoe Molding to Lay Sheet Flooring

- *Carefully remove wood shoe moulding.*
- *Replace sheet flooring.*
- *Replace wood shoe moulding.*



Applying Grout to Tiles

- *Select matching tile and mortar color.*
- *Remove damaged tiles to be replaced with a cold chisel, being careful not to damage the surrounding tile.*
- *Examine underlying mortar bed, filling voids with concrete floor patching compound if necessary.*
- *Spread tile mastic evenly in prepared opening using a toothed trowel.*
- *Place tiles in place, gently tapping with a rubber hammer to set. Check to make sure all grout lines are square and plumb.*
- *Allow mastic to dry.*
- *Apply grout with rubber trowel, keeping the trowel at a 45 degree angle to the joints (pictured above).*
- *After waiting six hours, check for, then fill any voids.*
- *After waiting another 24 hours, use a sponge and water to remove excess grout on the tiles.*



Baseboards are often composed of several different standard moulding pieces which can be found at local lumber yards.

tiles found in historic buildings can be found with some searching, even the small hexagonal pieces. Matching the mortar color can be accomplished by taking a sample to the tile supplier and using their experience in selecting the proper grout.

If necessary, first remove damaged tiles to be replaced with a cold chisel, being careful to not damage the surrounding tiles. Gentle hitting of the chisel will remove the tiles and lessen the chance of cracking other areas. After removal of the old tiles, examine the surface under the tiles to check for smoothness of the underlaying mortar bed. If a lot of irregularity is observed, a concrete floor patching compound might be needed to fill any voids. The end result should be a smooth, level surface that is the same height of the bottom of the adjacent tiles.

The prepared opening should then be spread evenly with a tile mastic, using a toothed trowel. After placing the tiles in place, gently tap with a rubber hammer to set, and check to make sure all grout lines are square and plumb. Allow the mastic to dry according to manufacturer's instructions. The grout is best applied with a rubber trowel, and should be placed by moving the trowel at a 45 degree angle to the joints. ☜ The tiles should be kept as clean as possible during this operation, but do not spend a lot of effort cleaning around the grout joints until it has dried. Allow to dry at least six hours and then check for and fill any voids. Wait another twenty-four hours, and then use a sponge and water to remove the excess grout on the tiles. This process can seem endless, so try to keep a sense of humor.

Wood Bases (or Baseboards)

are found in most historic buildings, and should remain in most cases. The wood bases are generally an integral component of the overall design of a room, and often work in concert with other wood trim, such as wainscoting, chair rail molding, and cornice molding. If the floor of a room requires work, it is advisable to remove, for protection, the wood base prior to the commencement of work. Removal should follow the guidelines mentioned under the exterior treatment section, labeled "wood trim." Great care should be taken in the removal of this trim to prevent damage. As each piece is removed, it should

be marked, and a corresponding diagram created showing where the pieces fit in the room.

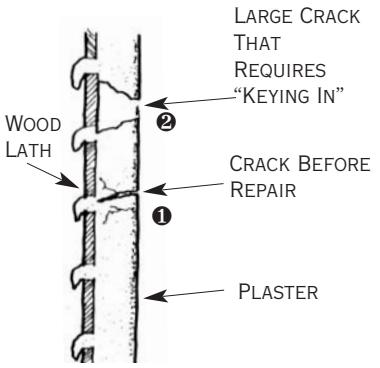
If pieces of wood base are severely damaged and need replacement, care should be taken to secure identical matching pieces. Many times a floor base is a composition of different standard molding pieces, which may be readily available at most lumber yards. Sometimes a wood base can be removed from a less visible area, such as a closet or attic, and reused at the replacement area. If a wood molding cannot be found to match the existing, see a finish carpenter or a cabinet maker, who can recreate the original style. Sometimes all of the wood base is missing from a room, but the style can still be approximated by inspecting other similar rooms in the building, or perhaps by inspecting old paint marks that may have left a silhouette of the wood base. Again, the base is an important part of a room, and should be carefully selected. If there is no way of determining the original trim, inspection should be made of similar structures in the city to copy a style, or contact a professional (interior designer, architect, or contractor) familiar with historical restoration.

Walls

Plaster Walls

are typically found in historic buildings constructed prior to the 1950s. Because of the brittle nature of the material, cracking is common, but generally easily repaired. Hairline or other minor cracking can be caused by normal settlement or one time disturbances, such as an earthquake, but larger cracks may be the result of structural problems in the building. If there is any chance that the cracking may be from a structural problem, a professional should be consulted to solve the problem prior to repair. If appropriate structural remedies are not taken, the repaired crack will most likely reoccur in a short time (see the earlier Foundation section, page 18).

Hairline cracks should be etched with a putty knife or pointed file to remove any loose debris. The crack should then be thoroughly cleaned, and the crack damped using a sponge or a paint brush. Use a plaster patching compound available at most hardware



Patching Plaster Cracks

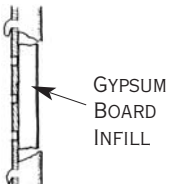
- *Ascertain whether crack is from normal settlement or earthquake disturbance OR is indication of more serious structural problems in the building (see page 18).*

For Hairline Cracks (❶):

- *Etch crack with putty knife or pointed file to remove any loose debris.*
- *Clean and dampen crack with sponge or paint brush.*
- *Gently fill crack with plaster patching compound available at most hardware stores.*
- *Smooth surface with trowel then sand to provide a smooth finish that matches the adjacent surface.*
- *Seal with good quality sealer then paint.*

For Larger Cracks (❷):

- *Clean crack with putty knife or file to remove debris and other material.*
- *Enlarge crack at the interior to create a "keying in" of the patch.*
- *Place pieces of gypsum board (sheetrock) in the enlarged crack and nail them to lath. Sheetrock should be same thickness as old plaster or a fraction less.*



- *Apply at least two layers of thickly-mixed patching plaster, pressing firmly into cracks and lath, stopping just shy of the original thickness.*
- *Level patch with a final thin coat of plaster.*

stores and gently press it into the crack to fully fill the crack. Smooth the surface with a trowel, and after the patch dries, sand it to provide a smooth finish that matches the adjacent surface. The new patch should be sealed with a good quality sealer prior to painting to eliminate possible excessive absorption of the paint.

Larger cracks should be cleaned with a putty knife or file to remove debris and any other loose material. The crack should be enlarged at the interior of the crack to create a "keying in" of the patch.

As with a hairline crack, first dampen the area, then apply the patching compound. Large cracks should be inspected after twelve hours of drying time to check for shrinking, and if the area has voids or is not flush with the adjacent surfaces, the patch should be redampened and a second coat of the patching material should be applied. (Shrinkage occurs as the water in the compound dissipates.) The final surface should be finished to match the adjacent texture, and a sealer applied prior to painting.

If a building has evidence of plaster pulling away from its wood lath, perhaps in a whole panel (usually a result of water damage), all of the loose plaster should be removed from the wood lath, and the area repaired. The loose plaster is very dangerous in an earthquake and should be repaired immediately.

After removing the plaster, the wood lath should be inspected and repaired, replaced, or renailed as required to form a secure base. One way to fill the area is to apply three coats of plaster over the area. Another, perhaps easier way for a novice, is to attach gypsum board to the wood lath, and then apply a skim coat of plaster over it to match the texture of the adjacent surfaces. The dry wall should be cut and placed so as to fill up as much of the area being patched as possible, making sure the surface of the drywall is recessed about ⅛ inch from the adjacent plaster finish. The gaps between the drywall and the existing plaster should be filled with two or three coats of plaster patch first, (allowing for drying time between applications), and then a final surface coat should be applied over the

drywall to create a smooth homogeneous surface and texture with the adjacent areas.

Several coats of the filler may have to be applied, particularly at the meeting point of the old and the new. The finished surface should be coated with a sealer, then painted.

Working with plaster is very dusty and dirty, and consideration should be given to removing wood base trim, and protecting wood floors. Any furnishings in the room should be covered for maximum protection.

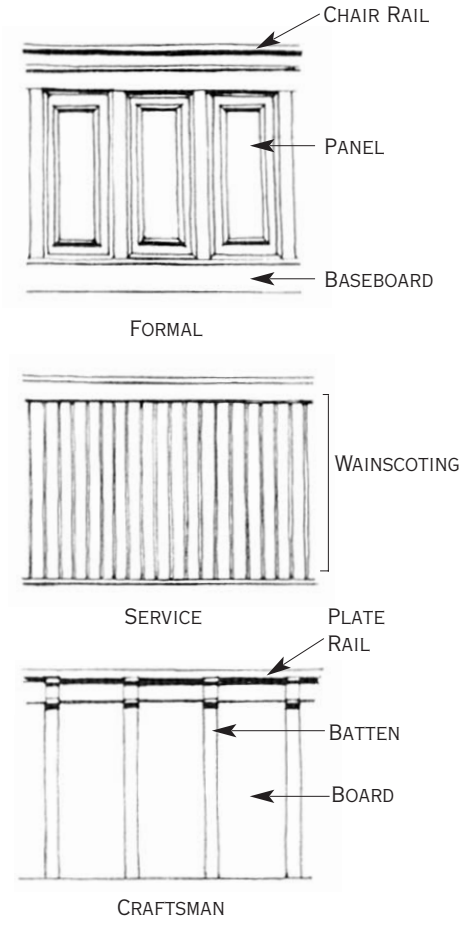
Wood Walls

are found in many historic buildings. Sometimes a whole wall is wood, but most often the wall has wood only on the lower portion (often one-half) ☞ of the wall. The wood portions are the wood trim base at the floor; a wainscoting, which can be comprised of wood panels or perhaps vertically placed boards; and at the top, a wood trim chair rail or plate rail.

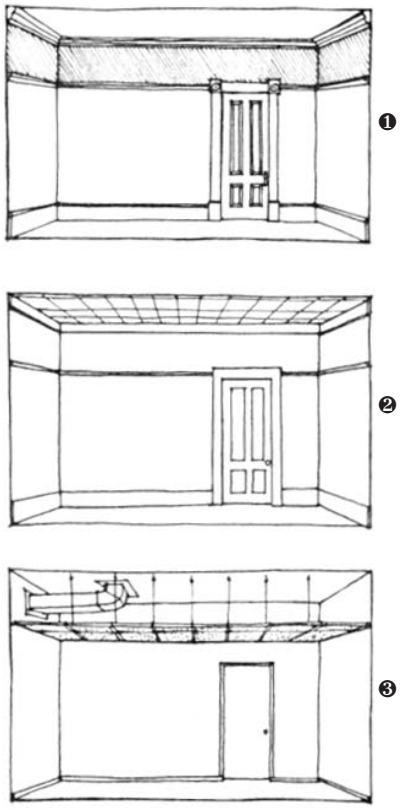
The wood was originally either stained and sealed or painted, based upon the style of the building. A determination should be made as to the desired final finish for the wood portion based on what the original architectural style of the room was and how much effort and money will have to be spent for different methods of refinishing.

If a wood wall is currently painted, it may be determined to keep the painted surface. The wood should be properly prepared to receive new paint, perhaps by removing pieces of the wood trim to allow even application. A local paint supplier can assist in selection of the proper paints to be used.

Restoring a stained wood finish to a wood wall, whether it is currently painted or not can be a tremendous amount of work, but also very rewarding because of the beauty revealed. The restorations of the woodwork can be similar to furniture refinishing, and a full commitment must be made to do the job properly. Generally, a good paint removal process should be used, and most paint suppliers can suggest a good method and the proper materials. Follow the manufacturer's suggested procedures, and be sure to allow enough time to do the job properly. If, after some investigation of the amount of effort required

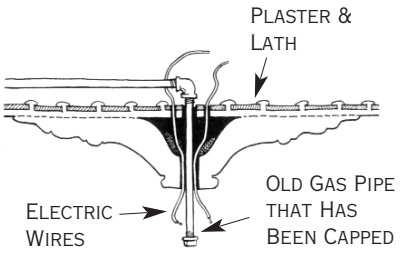


Wainscot Styles



Ceilings—Do and Don't:

- *Preferred—Preserve original ceiling and wall treatment or sheetrock ceiling and replace molding.* ❶
- *Adequate—Leave proportions and locations of room but install new plain acoustic tiles directly upon the ceiling, above a molding of adequate width.* ❷
- *Objectionable—Do not lower ceiling with holes or heavy texture on the surface of the panels. This destroys the decorative elements and proportions of the room.* ❸



Rosette Ceiling Fixture

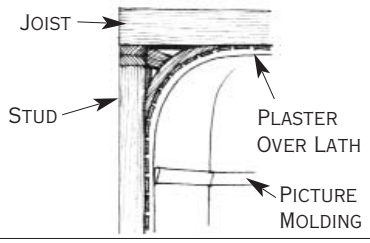
to do the job properly, it is decided to hire a professional, be sure to ask to see samples of other work similar to your project.

Work with a paint supplier to select the final finish (if possible take pieces of the wood to use for samples). Generally the finish should be either a varnish or lacquer type, or an oil finish, such as tung oil or Danish oil. Be sure to follow manufacturer's suggested application procedures, and the key is to not apply too much material at one time.

CEILINGS

Plaster Ceilings

are generally found in historic buildings. They should be carefully inspected for damage due to structural or water related problems, and those items corrected prior to any work on the plaster. Patching techniques for ceilings should follow the guidelines presented in the Plaster Walls section of this manual.



Coved Ceiling Detail

Care should be taken with plaster detail work in a room, such as coved corners or decorative work, such as rosettes and plaster cornices. These items should be retained in a room because of the additional character they present. Detailed plaster work should be delicately handled, and if replacement or repair is necessary, stores, professionals or companies specializing in Victorian ornamentation should be consulted.

Care should be taken in working with the ceiling of a room to preserve the original design intent of the space. The height of a ceiling is an important part of the scale of a room, and should be preserved. Many rooms have been destroyed by the introduction of suspended ceilings in a room previously having a dynamic ten foot high ceiling. The use of suspended ceilings is strongly discouraged, and where such ceilings exist, removal is recommended.

Painting

Painting the interior of a historic building should be very carefully approached to avoid ruining the original charm of the rooms. It is recommended that colors be selected by reviewing books on historic buildings or by working with a architect or designer who is experienced with color selection for historic buildings.

Some general guidelines for painting interiors include proper selection of what materials to paint. Wallpapered surfaces should be stripped prior to painting. Unpainted brick, tile, or wood surfaces should not be painted, for it would change the character of a room.

Lighter colors tend to make a room feel larger, while darker colors generally make a room feel smaller. Warm colors can make a room with little or no sunlight feel warmer. Both warm or cool colors are appropriate for sunlit rooms, but warm and cool colors should not be mixed in the same room.

When choosing colors, look at the room as a whole and consider any adjacent room that can be viewed simultaneously. The two rooms will need to work together, either with the same colors, or with colors that are harmonious. Generally a single color, or at most two colors should be used, but remember that the surfaces of the room will be acting as a backdrop for furniture, paintings, plants, etc. If there is wainscoting in the room, interest can be created by having the upper portion of the wall be lighter than the lower section. Sharp, contrasting colors should be avoided, as well as overemphasis of wood detail by "banding" color to follow trim lines. Ceilings more effectively reflect light when painted white or light earth tones.

Structural & Mechanical

Structural Investigation

The structural integrity of an historic building is essential to its preservation. A very first step prior to any rehabilitation work is to perform a visual check to look for cracking of surfaces, sagging doorways or beams, or floor sags. Any of these could mean structural problems, and an experienced professional (contractor, engineer, or architect) should be contacted for further analysis.

If engineering work is required, it is recommended that an engineer and/or architect experienced in historic structures be retained to perform the work, in order to retain the historical integrity of the building. Likewise, when the construction of the structural modifications are contracted for, it is recommended that the general contractor provide references and a list of previous historical rehabilitations. Lists of such professionals can be obtained through the City Planning Department.

General Electrical and Lighting

Many older residences were equipped with a 30 amp service, and the circuiting was often the knob and tube method, where the wire passes through the walls and attics of a house supported by porcelain knobs. This type of service, when in good repair, is adequate if the electrical needs of the user are quite low. Because of the high use of appliances and air-conditioning, most new houses today are equipped with a 100 amp service.

In planning the work on a residence, careful examination should be given to the types of appliances, water heater, and heating and air-conditioning systems to be used. It is recommended that a licensed electrical contractor be contacted regarding your current and proposed service, especially if the house has the older form of 30 amp equipment. Recommendations will vary from leaving everything the way it is, or adding a new service to a portion of the house, to adding a new service and rewiring the whole house.

Lighting fixtures are an important part of the interior (and sometimes exterior) of a building and should be chosen carefully. If at all possible, the original fixtures should remain. If a fixture is inoperable, an electric repair shop can probably replace some standard parts to make it functional again. If the light is not adequate for the size or use of the room, it is recommended that additional light be added to the room while retaining the original fixtures. When adding fixtures, or if necessary replacing fixtures, care should be given to the style of the new fixture. Often reproductions of antique fixtures can be found, but care should be taken to match the existing size and styles found in the building. Many "antique" fixtures today are too flamboyant and decorative. Many new houses have a centrally located fixture in the ceiling of a room. While this design was also used in old houses, often wall mounted fixtures were used. Consideration should be given to using floor lamps, table lamps, and wall mounted lamps when designing the lighting of a room, for it often gives more flexibility as well as a more intimate feel to the room. Fluorescent lighting is used in new houses, particularly in bathrooms and kitchens. Fluorescent light produces a bluish light, while the typical fixture in an old house is incandescent and produces a warmer red tone. It is recommended that only incandescent fixtures be used when rehabilitating an old house.

Plumbing

The plumbing in older buildings should be carefully investigated, for leaking lines can cause severe water damage and improper plumbing hook-ups can cause unhealthy mixing of fresh and waste water. Plumbing lines are generally of two types, fresh water and waste water. Fresh water is connected to a building from a meter at the street, and can be separated into two lines at a water heater. From that point, there are generally two lines running parallel to each fixture that requires both hot and cold water. In most older buildings this piping was usually galvanized pipe. The waste system flows in the opposite direction, from the fixture back to the main sewer line in the street. The waste lines in older buildings were generally cast iron.

Many times, the original plumbing lines are still in good condi-

tion, and will not need to be replaced. When inspecting the plumbing, look for leaks (indicated by water stains at walls, ceilings, or floors), and sufficient water flow, in both the fresh and waste lines. Leakage can be the result of bad connections or holes in the pipes. Inadequate water flow can be the result of built-up corrosion and may necessitate new piping.

If minimal repairs are necessary, replacement can be made with the original materials. If a new system is required, the material used will probably be copper or plastic for the fresh water, and plastic or cast iron for the waste. If additions are being made to an older building, the newer materials can be used for additions by incorporating a proper type of connector between the old and the new materials.

New plumbing and repairs should be approached very carefully to avoid damage to existing materials and spaces. Repairs in walls should be approached at the least visible side, and with delicate care in removing any original materials, such as wainscoting and wood trim. If necessary, piping may be re-routed to a different wall, or to the walls of an addition to prevent damage to important walls. New vertical chases or dropping a ceiling in a room should be avoided, for it would destroy the original character of a room.

Many of the original toilets, tubs and sinks in old buildings were either porcelain or vitreous china, and they were often complemented with brass faucets. A porcelain sink or tub can be repaired if it is cracked, chipped or just severely stained by having it refinished. This is generally less expensive than replacing the fixture, and will retain a piece of the original material of the building. Often, old brass faucets that are not operating properly can be repaired by cleaning and/or replacing worn washers. If the finish is highly pitted or tarnished, the faucets can be replated. If replacement sinks, tubs, toilets or faucets are required, salvage yards can be contacted to possibly locate a similar operational fixture. If a new fixture is required, it is recommended that either an authentic reproduction or a very simple modern fixture be used. Many of the new and very ornate fixtures produced today as "antique" fixtures are not recommended for they contra-

dict the simplicity found in most older fixtures.

Heating, Venting, and Air Conditioning

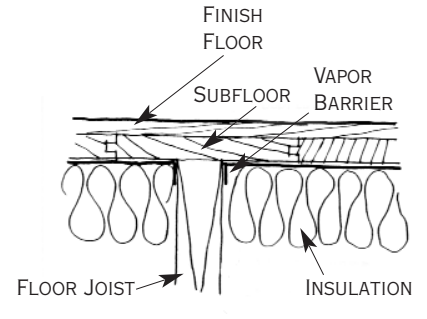
Historic buildings were originally equipped with only heating systems. Buildings with air-conditioning have had the systems retro-fitted, sometimes with no attention given to the historic fabric of the building.

Many residences have old gravity heaters, which may still be very functional. Generally these are gas fired, and if they have been out of use for a period of time, should be inspected by the gas company. (While the gas company representative is out at the building, have him survey the gas lines, and any other gas operated equipment.) A thorough check should be made of all ducts to check for broken members or leaky connections.

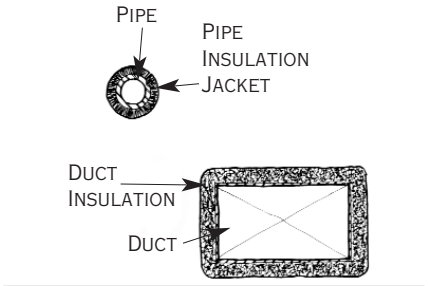
Some residences may have had a FAU unit (Forced Air Unit) installed, which may provide both heating and air-conditioning. This type of unit can be used effectively in historical buildings provided that the ducts and units themselves are properly placed in the building and/or on the site. In Riverside, a popular way to air condition is to use a refrigerant window unit, or a swamp cooler. These are less expensive, but can seriously detract from the aesthetics of the historical building. ☞ Installing these units when rehabilitating a historic building is not advised and serious consideration should be given to removing them if at all possible if they currently serve the building. If these units are the only feasible means of cooling, they should be located at the rear of the house to alleviate any disturbance to the historical facade of the building.

FAU systems are appropriate for residential buildings, but the design of the system should be sensitive to the historic features of the building. Units should be placed in an inconspicuous place (both the air handling unit and the condenser). Ducts and registers must be carefully located so as not to distract from the interior of the building. Common errors in locating the ducts include furring down a ceiling in a room that has a twelve foot high ceiling, or running a chase along the side of the room to carry the duct. Destroying decorative

The Aesthetics of a House Degraded with Installation of Window AC Unit



Insulating Crawl Spaces



Insulating Pipes and Ducts

plaster ceiling work to place a register, or cutting through a beautiful wood cornice trim are other common errors. An experienced professional should be retained to plan the system to provide not only the desired comfort level but also the desired aesthetic level.

Historic buildings are not required to comply with the state of California's Energy Law, Title 24. However, the system designer should still make every effort to design an energy conserving system, which will approximate the requirements of Title 24.

Energy Saving Techniques

Although many historic buildings have energy saving construction which may not be seen in techniques today, historic buildings often are lacking in some simple measures which can make the buildings operate more efficiently. Some of the energy saving methods seen in historic buildings include limited areas of glass, and have porches or awnings to provide sun shade, large trees and bushes planted to give sun and wind protection, and placement of windows to allow efficient cross ventilation.

There are however, items of current technology that can be applied to historic buildings to make them more energy efficient, but they must be applied properly to protect the historical elements of the building. It is recommended that *Preservation Briefs #3* "Conserving Energy in Historic Buildings" by Baird M. Smith A.I.A., be read carefully by both the owner and professional involved in applying energy saving measures. (A copy is available through the Planning Department.)

Insulating wood stud walls may sound like a great idea, but improper insulating can cause severe damage to a historic building. Placing batt insulation is one way of insulating the wall, but to accomplish it, one whole finished surface of the existing wall must be removed to allow it to be placed. While possible with clapboard, or shingle siding, damage to material and high labor costs generally make this method unfeasible. Another method is blowing in an insulating material or injecting a chemical which acts as an insulator. However, these methods require the addition of a vapor barrier as well as cavity ventilation to be effective and

non-destructive. The Historical Brief recommends blown-in cellulose with boric acid as a fire retardant as the best type of blown-in insulation. Highly discouraged is the use of urea-formaldehyde foam (its high moisture content can cause severe water problems to the existing structure), and the use of cellulose, which uses ammonium sulfate or aluminum sulfate as a fire retardant (the sulfates may mix with the air to form an acid which may harm the historic building).

Insulating the crawlspace, unheated basement, or attic of a historic building is a good idea if the areas are accessible. The best and easiest to install is six inch (Rl9) batt insulation, usually made from fiberglass, or mineral wool. The material should have a vapor barrier and should always be applied with the vapor barrier at the inside face of the cavity.

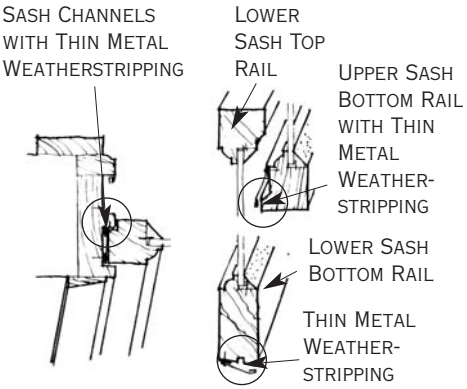
These areas should also be checked for proper ventilation to insure air movement to dry out the spaces.

Pipes and ducts that pass through attics, crawlspaces, or basements should be insulated to provided protection from energy loss. Most hardware stores carry a good selection of this insulation, and installation is relatively simple.

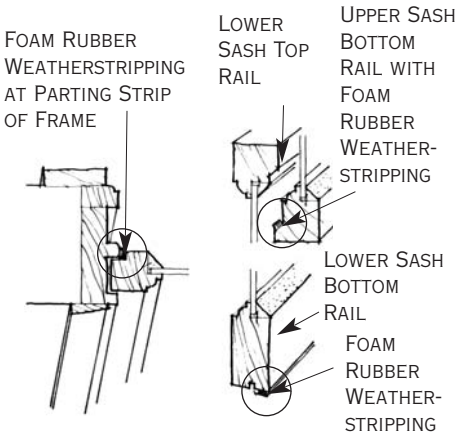
Another simple energy saving technique is to provide the water heater with an insulation blanket. These are readily available a most major hardware stores as well as major department stores.

The addition of awnings can cut down the heat entering a building tremendously, but they must be of a type and style appropriate to the historic building. Canvas awnings are usually most appropriate, as long as they are shaped and colored to complement the building, not detract from it. Aluminum awnings are NOT appropriate and should not be considered.

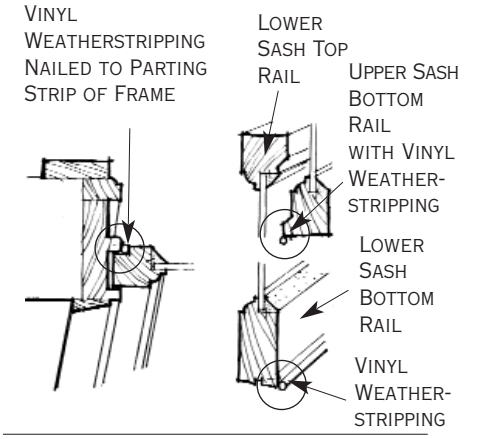
Most windows in historic buildings are not weatherstripped, and definitely should be. There are three general types of weatherstripping: thin metal, foam rubber, and vinyl. All three are easily found in most hardware stores, and inspection of the actual material is suggested. All three are relatively easy to install, and all are similar in effectiveness.



Metal Weatherstripping



Rubber Weatherstripping



Vinyl Weatherstripping

Retrofit for Earthquake Safety

Do you have questions about the ability of your historic home to withstand earthquakes? An inspection can uncover problem areas that might cause damage during a temblor. This list of questions can help you find the weak links in your structure. Each question that you answer "yes" indicates a potential problem.

yes *no*

Foundation

- ❍ ❍ Are there any signs of settlement or movement—cracks, sloped floors, or leaning walls?
- ❍ ❍ With brick or stone foundations, is the mortar loose or missing? With concrete foundation, is the surface deteriorated or spalling?
- ❍ ❍ If your home was built prior to 1935, do you still have an unreinforced masonry or concrete foundation?
- ❍ ❍ Do you have a "post and pier" foundation, consisting of wood posts which support the entire structure and are, in turn, supported on isolated concrete or masonry footings?
- ❍ ❍ Is there any sign of wood deterioration, termites, or water damage?
- ❍ ❍ Do the downspouts dump near the foundation or does the ground slope toward the foundation? Allowing water to collect next to the building can accelerate deterioration or cause settlement of the foundation.

Walls & Columns

- ❍ ❍ Are columns—particularly in the basement—rotted, undersized, or poorly attached to the basement floor or the wood beams they support?
- ❍ ❍ Is there a "soft story"—weak, undersized, or unbraced walls or columns, such as garage or open basement, supporting a heavy, solid portion of the house?
- ❍ ❍ Are there any "cripple" walls (short studs that extend from the top of the foundation wall to the underside of the first floor framing, which forms the crawl space under the house) supporting floors or walls above?

yes *no*

- ❍ ❍ Is there any cracking in the brick walls particularly above, below or between windows or doors?
- ❍ ❍ Are there any masonry parapets or gables?
- ❍ ❍ Are there large openings in the exterior walls, or openings which were added or enlarged?
- ❍ ❍ Are there any additions to the house not securely attached to the house or pulling away due to settlement or a poor foundation?
- ❍ ❍ Are porch columns angled, shifting, unsecured, or "punching through" the porch deck or roof?

Floors & Ceilings

- ❍ ❍ Is the bridging between the joists poorly secured, absent, or spaced more than eight feet apart?
- ❍ ❍ Are the floor joists simply resting on the foundation, in joist pockets, or only toe-nailed (that is, nailed diagonally through the floor joist) to the foundation walls?
- ❍ ❍ Have any joists been substantially cut away—particularly where plumbing, wiring or ductwork was installed?
- ❍ ❍ Are any joists split, twisted or rotted?

Roof

- ❍ ❍ Are there rafters or trusses that are not attached with fasteners to the load bearing (usually exterior) walls?
- ❍ ❍ Is the roof decking only boards with gaps between instead of continuous plywood?
- ❍ ❍ Are there heavy roofing materials, such as tile or slate?

yes	*no*	
❍	❍	Are masonry chimneys, parapets or gables unbraced, unreinforced or not secured to the roof or ceiling structure?
❍	❍	Is the mortar on the chimney deteriorated?

Historic & Interior Features

❍	❍	Is the plaster cracked more than just hairline or seasonal cracking?
❍	❍	Are there tall furnishings unsecured to walls, such as cabinets, bookcases, hutches or clocks?
❍	❍	Could hanging or tall light fixtures swing into walls or fall?
❍	❍	Is the water heater freestanding or not secured to the building structure?
❍	❍	Is the gas supplied through a rigid pipe?
❍	❍	Are cabinet doors unsecured by latches?
❍	❍	Are valuable objects, antiques, collectibles or equipment unsecured or on open shelves?

Site & Building History

❍	❍	Are there parts of neighboring buildings or site features (such as chimneys or retaining walls) that could damage your house if they collapsed?
❍	❍	Has your house been damaged by previous earthquakes or ground settlement?
❍	❍	Has there been heavy, repeated shaking of the ground by heavy equipment?
❍	❍	Has the house been poorly maintained over time?

If you've answered "yes" to even one of these questions, your house may be at risk from an earthquake. Many possible repair or retrofit options are presented here and—in greater detail—in sources listed in the "Further Help and Resources" section. Much of this seismic retrofit work can be completed by an experienced, do-it-yourself homeowner with the right tools and good repair skills. Be realistic about your abilities and available time.

Substantial retrofits—such as adding new foundations or shear walls—may require the professional assistance of a licensed engineer, architect and/or contractor.

Solutions to Mitigate Earthquake Risks

Once you have inspected your home and identified problem areas, you can begin to develop solutions that mitigate risk from earthquakes. Some typical solutions are presented here; for more detailed information, contact a professional.

FOUNDATION

Install Anchor Bolts

Anchor bolts securely tie the walls of your home to its foundation with either expansion or epoxy anchors. Expansion anchors can be used in sound concrete, while epoxy anchors should be used in a foundation that is in poor condition.

Secure Joists to Foundation

The anchor secures the floor joist to the foundation.

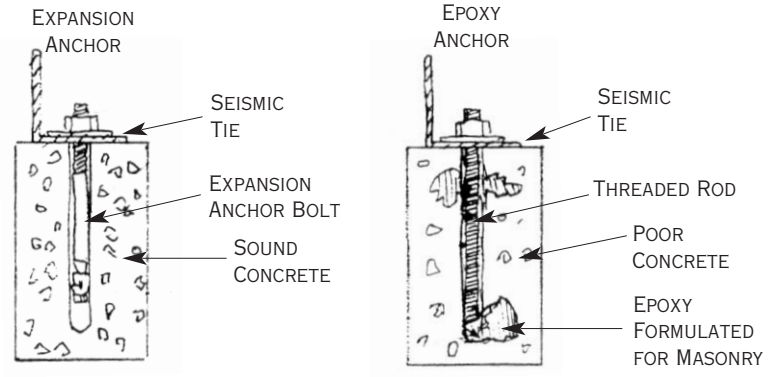
Brace Post and Pier Foundation

A bracing system—placed at the base of your house around the exterior and interior—can prevent your home from "tilting" off its foundation.

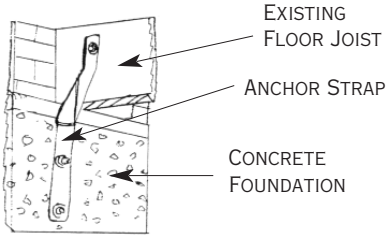
Replace Existing Foundation

If your existing foundation is deteriorated or determined inadequate, a new foundation should be installed. Consult an architect or engineer for advice before proceeding with this alternative.

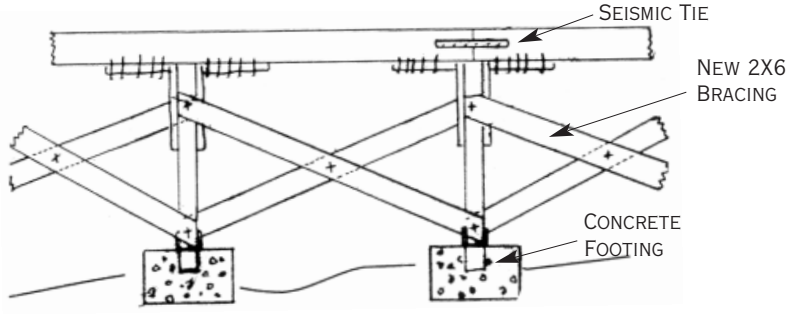
Installing Anchor Bolts



Securing Joists to the Foundation



Bracing Post and Pier Foundation



Interior Features

Secure the Water Heater

Secure the water heater with rigid supports, strapped to the tank and bolted to the wall structure. Also, replace a rigid gas line with a flexible one.

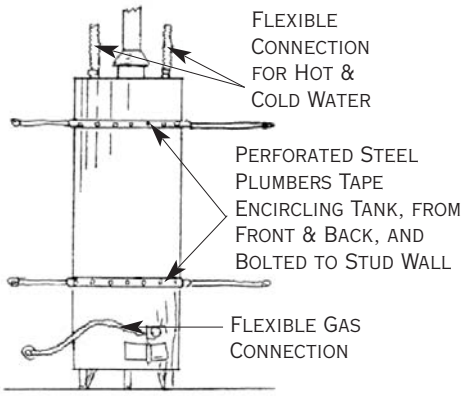
Install Cabinet Latches

Add latches to cupboards to prevent opening and spilling of contents.

Secure Shelves, Pictures, Cabinets and Other Furnishings

Tightly secure furnishings to the studs using wire, straps, braces, or bolts.

Securing the Water Heater



Roofs

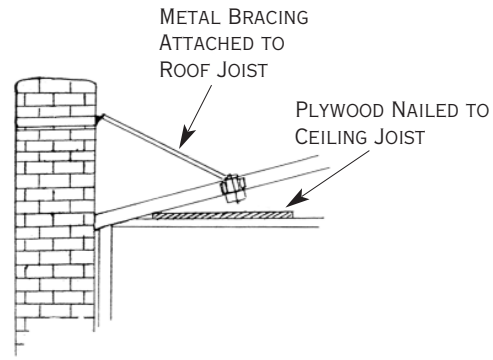
Reinforce Chimney

Repair mortar joints as needed and brace the chimney to the roof. Nail plywood to the ceiling joists around the chimney to help protect from falling bricks.

Create Roof Deck Diaphragm

Nail structural plywood to the rafters after all roofing material is removed to improve the roof diaphragm.

Reinforcing the Chimney



Walls & Columns

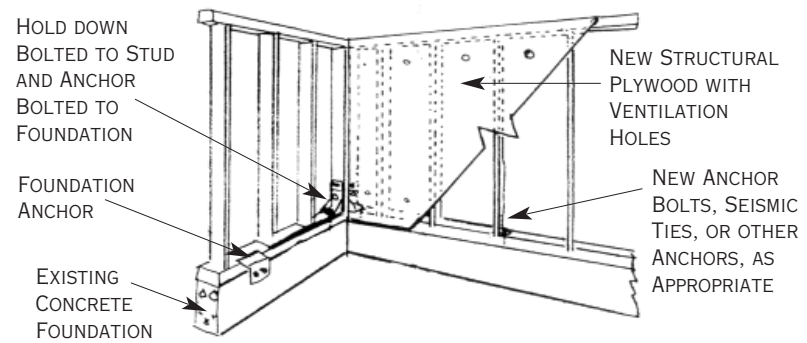
Create Shear Walls

Cripple walls and soft stories can be strengthened with shear walls that are positioned at right angles to each other. Installation includes securing top and bottom of stud wall to the house structure and covering the entire wall with structural plywood.

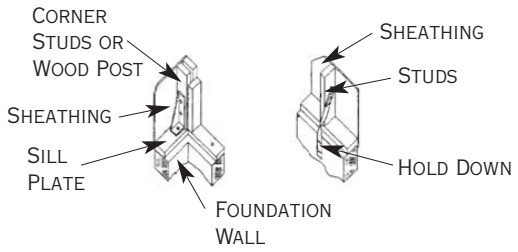
Install Hold Down Brackets

If your home has short lengths of wall, they need to be secured to the foundation, as they have a greater tendency to rock during an earthquake than long, solid walls.

Creating Shear Walls



Install Hold Down Brackets



Floors & Ceilings

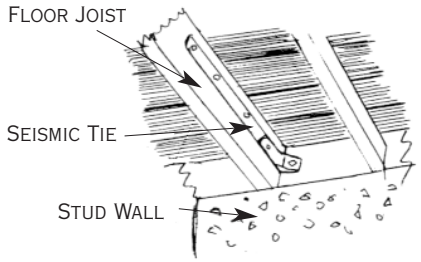
Upgrade Connection between Joists & Stud Walls

Use reinforcing angles or seismic ties to strengthen the connection between floor joists and stud walls.

Improve Floor Diaphragm

The horizontal diaphragm—consisting of the floors, ceilings, and roof—can be strengthened by installing solid '2x' bridging between all floor and ceiling joists at midspan.

Upgrading Connection



Floor Diaphragm